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1989-1990 ANNUAL REPORT

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

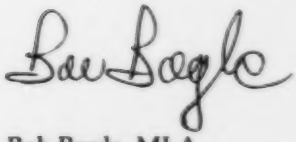
Alberta

91-02479/

To the Honourable Shirley McClellan
Associate Minister of Agriculture

In accordance with the requirements of the Alberta Agricultural Research Institute Act, I have the honour to present to you the Annual Report of the Alberta Agricultural Research Institute for the operating year 1989-90.

Respectfully submitted,



Bob Bogle, MLA
Chairman
Board of Directors

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CHAIRMAN'S REPORT

I am pleased to present the third Annual Report of the Alberta Agricultural Research Institute.

Agriculture is a mainstay of Alberta's economy, but it faces many challenges. How can we have a healthy industry today as well as in the years ahead? How can we combine economic profitability with environmental sustainability? How can we compete in the tough national and international markets? World-class research is a vital component in meeting these challenges. It is one of the important reasons that the Alberta Agricultural Research Institute was created.

As Chairman of the Institute's Board of Directors, I am honoured to have played a small part in the development of this important agency. The purpose of the Institute is to coordinate, promote, priorize and support research in agriculture, and to ensure transfer of the resulting knowledge for the benefit of a strong, sustainable agri-food industry.

Created in 1987 by the Alberta Legislature, this Crown corporation is helping agricultural research in Alberta to become increasingly successful in meeting the needs of this vital industry. By funding well-designed, focused research, we will be better able to meet the challenges of today and tomorrow.

Although the Institute is still a young organization, each year we make important strides toward our goals. This was certainly the case in 1989-90, a year filled with substantial accomplishments.

The Board continued to support projects under its two main funding programs: the Matching Grants Program and the Research Coordination Program. Applications for both programs are reviewed once a year. Proposals are first assessed by the Board's five research committees: Agricultural Processing, Diversification, Marketing, Production Efficiency and Resource Conservation. These committees then forward their recommendations to the Board which makes the final decisions on funding.

The Matching Grants Program was established to encourage the private sector to support agricultural research. The program provides funds to match research grants given by qualifying agencies. In 1989-90, 17 new and 21 renewed Matching Grants projects were funded with $946,036 from the Institute and $1.14 million from private industry and other public sector agencies.

The Research Coordination Program was created to encourage agricultural researchers to coordinate their work. More specifically, the program was intended to stimulate teamwork, to foster joint research planning and to maximize information exchange between researchers in the same field who work for different organizations or in different disciplines. In 1989-90, five new projects and two renewed projects were awarded funds totalling $33,600 under this program.

The first awards under the Research Professorship Funding Program were given in 1989-90. This program aims to help appropriate institutions to increase the priority and raise the profile of certain important and emerging research areas which unfortunately have received only limited support in the past. In 1989-90, the Institute awarded $80,000 for each of four professorships and encouraged the

recipient institutions to provide any additional funds needed for equipment, technical manpower, supplies and other costs.

Improving research cooperation and coordination is a crucial part of the Institute's mandate. Over the past year, the Board worked closely with the Council which administers Farming for the Future (an Alberta Heritage Savings Trust Fund program which funds agricultural research). During this time, Alberta Agriculture also undertook a review of research advisory roles to further promote coordination and minimize duplication. Taken together, this will, I expect, lead to a merger between Farming for the Future and the Institute. During the past year, one immediate result of this activity was the Alberta Agricultural Coordinating Committee, an advisory group for Alberta Agriculture, approved transfer of its research-advisory role to the Institute. By concentrating a number of these different activities in one single agency, support for agricultural research in Alberta will be more efficiently and effectively administered.

To better use funds available for research, the Board investigated opportunities under federal-provincial programs for joint research funding. It also continued to administer the provincial portion of a three-year, federal-provincial program to support commercialization of agricultural biotechnology projects, called the National Agricultural Biotechnology Initiative.

Also in 1989-90, the Board began a major initiative in research coordination and priorization: an ongoing review of agricultural research and research needs. Producer groups and private companies identified their research needs and priorities in three research areas: beef, forages and pulses. As well, research agencies made submissions to the Board concerning their involvement in these three areas. This review procedure is designed to encourage participation by and continuing liaison with the many stakeholders in agricultural research. By consulting with the many agencies and individuals involved in agriculture and agricultural research, the Institute will be better able to make funding decisions and to make recommendations for new direction in agricultural research. Its sector-by-sector assessment of research will continue in 1990-91.

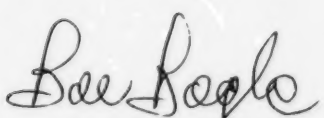
Board members undertook a variety of activities to ensure that they kept abreast of current agricultural research. The Board toured the University of Calgary's research facilities, some Board members attended conferences on agriculture and agricultural research, and all members received discussion documents, reports and recommendations from other agencies concerning a range of agricultural research programs.

It is critical for the Institute, like any growing organization, to evaluate its own progress. In 1989-90, the Board reviewed the Institute's progress to date and examined possible future directions in research and technology transfer. The Board also revised and refined its operational procedures and its proposal review process. A new committee structure is currently under consideration to better serve the dual role of assessing research proposals and evaluating research needs. The Board also sponsored a seminar to help potential grant applicants to become familiar with the ever-present forms and procedures.

The Board of Directors itself underwent some changes during 1989-90. Dr. David Reid, the University of Calgary's representative, and Dr. Dan Cornish from Olds College departed from the Board. Their valuable input will be greatly missed. The Board also gained two new members: Mr. Gary Severtson, MLA for Innisfail, and Dr. Trevor Thorpe, the new representative for the University of Calgary. I know their enthusiasm and wise counsel will be an asset to the Board.

I wish to thank all Board members for their untiring commitment to agriculture and agricultural research. In addition, the sound advice from the five research committees was a crucial component in the proposal review process. I would also like to recognize the Research Division of Alberta Agriculture for the day-to-day administration of the Institute. The diligence and energy of all these people were instrumental in the Institute's progress in 1989-90.

This past year and, indeed, all three years since the creation of the Institute saw abundant accomplishments by this agency. The next three years will, I am certain, yield even greater achievements. The Alberta Agricultural Research Institute is sowing the seeds for a better future for our agri-food industry.



Bob Bogle, MLA
Chairman
Board of Directors

EXECUTIVE DIRECTOR'S REPORT

Last year, 1989-90, I was once again pleased to serve as Executive Director of the Alberta Agricultural Research Institute. During the year, the Institute firmly assumed its role as the lead coordinating agency for agricultural research in Alberta.

The two primary activities in this area were province wide research program reviews and the forward planning needed to reduce the considerable number of research advisory committees spread across a number of different programs. As part of this effort, planning also started on a proposed merger of the Farming for the Future program with the Institute.

The research program review process was approved by the Institute's Board of Directors to obtain an organized, systematic overview of agricultural research activities and capabilities in Alberta. In addition to assisting the Board's objectives of research coordination and cooperation, these reviews also help Board members and review participants to identify the issues and priorities in agricultural research.

The review approach is by sector, i.e. beef, poultry, forages, cereals, etc., and by research organization. At each review meeting, representatives of the prime agricultural research organizations as well as producer groups and others who reflect specific interests were invited to make presentations to the Institute Board. The Board plans for the program reviews to be an ongoing process, with each commodity area undergoing a new review every three years. The information gained will be important in determining the future direction of agricultural research undertaken in Alberta.

A great deal of work was required to stage the three commodity area research reviews held during 1989-90. Besides organizing these sessions on beef cattle, forage and pulse research programs, working documents on general research activity in each sector had to be developed. At the end of each review, the various presentations were compiled and distributed to the participants who attended the review meetings. Summary documents which condensed the significant concerns brought forward by the participants were also prepared and distributed after the reviews were completed. All this work was undertaken by the staff of Alberta Agriculture's Research Division, and I commend all who were involved in this process. It was primarily due to their efforts that these reviews and many other Institute administrative activities were successfully carried out in 1989-90.

Over the year, I found increasing awareness in the agricultural community at large of the important mandate being carried out by the Institute. It indicates, in my view, that the Institute is continuing to make good progress toward both short- and long-term goals. With the continued leadership of the Institute's chairman, Mr. Bob Bogle, and the efforts of the Institute's able and conscientious Board of Directors, I am confident that the Institute will continue to develop into an outstanding agricultural research support organization.

R.G. Christian, DVM
Executive Director

ORGANIZATION

The Alberta Agricultural Research Institute is an Alberta Government Crown corporation established under the Alberta Agricultural Research Institute Act, 1987 and the Alberta Agricultural Research Institute Amendment Act, 1988. The Institute reports to the Legislative Assembly through the Associate Minister of Agriculture. It is governed by a Board of Directors appointed by the Associate Minister.

Day-to-day administration for the Institute is provided by Alberta Agriculture's Research Division. The Institute's Board has appointed the Research Division's Executive Director to also act as Executive Director of the Institute.

In addition, the Board is supported by five research committees, organized according to the Institute's five research priorities: agricultural processing; diversification; marketing; production efficiency; and resource conservation. Each committee is headed by a member of the Board of Directors.

Committee members can include additional members of the Board of Directors, recognized experts in the field, a staff member of Alberta Agriculture and a number of active producers and/or processors. All committee members must be appointed by the Chairman of the Institute's Board and be affirmed by the full Board.

The committees are expected to advise the Board on the operation of the Institute. Their designated functions include reviewing research proposals, examining research needs and opportunities, and promoting research coordination as well as facilitating the transfer of new technology.

The Board of Directors

The Institute is governed by a 21-member Board of Directors appointed by the Associate Minister of Agriculture. Collectively, the Board represents a number of different groups and agencies that perform or utilize the results of agricultural research.

A number of the directors' positions are assigned to representatives of specific institutions which are named in the Institute's enabling legislation. These institutions include: Alberta Agriculture; the Faculty of Agriculture and Forestry at the University of Alberta; Agriculture Canada; the University of Calgary; the Western College of Veterinary Medicine; Alberta Advanced Education; either Alberta Technology, Research and Telecommunications or the Alberta Research Council; and the Legislative Assembly of Alberta. As well, the Act provides for strong private sector representation on the Board from both the farming and agri-business sectors of agriculture.

Members of the Board have a number of duties. Their primary function is to oversee the business affairs of the Institute. The Board, however, has also assumed a wider role in the development and advancement of agricultural research in Alberta. In particular, the Board aims to identify general and specific needs and concerns relating to agricultural research and to assess and develop priorities for addressing those needs.

As a result, during the three years it has existed, the Institute has developed a number of programs and mechanisms to promote agricultural research endeavours.

Research Coordination

One of the most important responsibilities of the Institute Board is to ensure research coordination wherever possible. Many of the Board's efforts have been undertaken specifically in response to that goal.

Coordination starts with the Board's membership structure, which is designed to assist both the process of promoting and coordinating agricultural research among the various groups of research performers and users. For instance, having leaders of the province's major agricultural research organizations on the Board enhances agricultural research coordination among those groups.

In addition, Board members involved in farming or agri-business also provide input from the practical and/or commercial side of agriculture. Together these various perspectives on agriculture help to promote the exchange of information among all major segments of the agricultural community.

During previous years, the Board examined research activities by visiting and touring the major agricultural research facilities in Alberta. The tours and the discussions held with researchers from various institutions provided background information needed for Board members to assess the existing level of coordination and to identify areas needing improvement.

One result was the start of formal reviews of ongoing research programs in Alberta. These reviews started in 1989-90. The reviews are undertaken by commodity area, with the intention that all major commodity areas will undergo a review every three years. In 1989-90, the Board held reviews of beef cattle, forage and pulse research programs. Participants included representatives from all institutions active in the particular research topic, and representatives from producer and processor groups who have a stake in the development of new knowledge and technology in their areas of interest.

Administrative Support

Alberta Agriculture's Research Division provides day-to-day administrative services for the Institute. The Institute also employs one full-time staff member to assist in financial and administrative duties.

Staff prepare background information and policy and decision documents as required by the Board. In 1989-90, this work included preparing for the research reviews, eliciting and compiling submissions, and generating summary documents which were distributed to review participants.

FUNDING PROGRAMS

In 1989-90, the Institute operated two general funding programs to address specific needs and concerns within the agricultural research community. One is the Research Coordination Program, which helps the Institute fulfill its mandate to promote research coordination in Alberta. The other is the Matching Grants Program, which is intended to generate greater support for agricultural research from the private sector. This can be accomplished when the private sector either conducts more direct research or when it supports researchers at other public and private institutions.

In addition to these funding programs, the Institute Board had the responsibility to direct Alberta's participation in the National Agricultural Biotechnology Initiative. It also approved a new funding program to establish university research professorships in designated subject areas.

Research Coordination Program

The Institute's Research Coordination Program is intended to provide active encouragement for agricultural scientists to coordinate their work and to maximize the exchange of research information. Under this program, financial assistance is given to agricultural researchers in order to promote coordination and communication among researchers in the same field who work in different organizations and different disciplines.

One of the difficulties faced by all researchers is to remain informed of other work or advances occurring not only in the same specialty, but also in other types of research which could have an impact in their area. Therefore, Research Coordination grants are intended to assist with those extra costs of travel and direct communication which would encourage closer working relationships among researchers.

For instance, approved funds could be used for travel to attend annual research review and planning meetings, and inter-laboratory travel to enable researchers to occasionally work in one another's facilities. Funds can also be used to hold seminars and meetings if they answer similar concerns. In turn, it's expected that researchers who receive these grants and make use of this support would 'spread the news' among colleagues within their own immediate work areas. But, whatever the particular project, innovative ideas and approaches within the program are encouraged so long as the outcome would improve research coordination in Alberta.

In the nine research coordination projects funded by the Institute, there have been several different approaches used to address the concept of research coordination. In two instances, researchers proposed workshops to gather specialists in a field to discuss common needs and recent advances, and to plan coordinated approaches to research that will be undertaken in the near future. In one case, the project manager also developed a list of all Alberta specialists working in the fields of statistics and biometrics, an exercise which had never been undertaken before.

Several projects have used the approach of gathering small teams of researchers from several different institutions in order to coordinate their efforts to attack a particular problem. Topics being addressed in this manner include mastitis, soil and water engineering, and extending the storage life of meat and processed products in Alberta.

Whatever the specifics of any one project, the Institute's Research Coordination Program is the first program of its kind in Alberta. It has already proven effective in helping the Institute translate its mandate to promote research coordination into concrete action.

RESEARCH COORDINATION PROJECTS

Project Title and Objective	Researcher/ Institution/ *Location*	AARI Funding 1988-89	AARI Funding 1989-90
AGRICULTURAL PROCESSING			
Interagency, Interdisciplinary Research to Extend Chilled Storage Life of Meat, Poultry and Processed Products to launch a concerted, comprehensive, interagency, interdisciplinary research effort on extending refrigerated storage life so that lower cost sea transport can be used by Alberta and Saskatchewan food processors to help their competitiveness in exporting chilled meat products to remote markets.	L. Jeremiah Agriculture Canada *Lacombe*		5,500
DIVERSIFICATION			
Deer Farming Management Practices and Effects of Various Production Parameters to collect information concerning red deer farming; and to transfer this information to researchers in western Canada.	J. Haigh Western College of Veterinary Medicine *Saskatoon*	4,900	completed
The Future of Prairie Agriculture to look at the future of western Canadian agriculture and to coordinate appropriate research and development programs on topics such as markets, production systems, communities and climate.	P. Martin University of Alberta *Edmonton*		5,000
PRODUCTION EFFICIENCY			
Coordination of Research on the Spider Syndrome in Suffolk Sheep in Alberta to promote the exchange of information and coordination of research on the spider lamb syndrome in Alberta.	B. Matejka Alberta Sheep Breeders Association *Calgary*	4,500	final report pending
Proposed All-Alberta Applied Statistics and Biometrics Workshop to compile a mailing list of statisticians and biometricians working in Alberta; and to organize a workshop for these specialists.	L. Florence Alberta Environmental Centre *Vegreville*		5,000
Coordination of Mastitis Research in Agriculture Canada (Lethbridge) and the University of Calgary to coordinate studies on the causes of mastitis at the University of Calgary with dairy herd studies at the Agriculture Canada Research Station in Lethbridge and the results of field studies throughout southern Alberta.	K. Cheng Agriculture Canada *Lethbridge*		3,600
Crop Molecular Biology and Biotechnology in Alberta: A Workshop to Review and Plan *Brassica* Research to bring together Alberta researchers working on crop molecular biology and biotechnology, especially in relation to oilseeds, to discuss research objectives and the techniques utilized to meet these objectives.	A. Johnson-Flanagan University of Alberta *Edmonton*		5,000
RESOURCE CONSERVATION			
Coordination of Soil and Water Engineering Research in Alberta to coordinate research activities at the University of Alberta and Agriculture Canada in the study of optimum seedbed conditions for cereals, oilseeds and special crops, methods of seeding and fertilizer application, soil compaction, and soil and water conservation.	K. Domier University of Alberta *Edmonton*	3,000	5,000
Soil Fauna and Structural Development under Different Tillage and Cropping Systems in the Peace River Region to integrate farmers' experiences with research results and to promote interactions between university staff, producers and scientists concerning tillage and cropping systems in the Peace River region.	M. Arshad Agriculture Canada *Beaverlodge*	3,950	4,500

Matching Grants Program

The Matching Grants Program is intended to increase private sector participation in agricultural research. Under this program, the Institute matches, usually on a 50:50 basis, contributions for approved research projects.

The Matching Grants Program has a number of guidelines; however, the following are especially important. To qualify, researchers must have already obtained support from an eligible source. These sources include private companies, foundations, individuals, and non-Alberta government agencies. Priority is given to matching funds from the private sector. Funds from federal agencies must also be 'new' dollars, which have not been diverted from an existing program or funding which already applied to Alberta.

Matching Grants projects are approved in five different categories. These categories – Agricultural Processing, Diversification, Marketing, Production Efficiency, and Resource Conservation – reflect the range of needs across Alberta's agriculture industry and are the areas which the Institute's Board of Directors are treating as priorities for the purpose of research funding.

In agricultural processing, for instance, there have already been several decades of sustained effort to increase the amount of value-added processing which occurs in Alberta. By increasing investment in research, it is hoped that new employment and income will be generated, in addition to that which is already produced in primary agriculture.

Agricultural processing research projects funded by the Institute cover a range of topics. They include increased domestic processing for existing commodities, such as meat; expanding the use of Alberta commodities in local products, such as canola oil; and finding new uses for crops with good potential for expanded production.

Among the Institute's completed projects was one in which it contributed funding toward construction of a research blast-chill unit. The purpose of the unit is to rapidly chill red meat carcasses to temperatures between 0 and -40° C. Using this unit, new research was already underway in 1989-90 to find the optimum method of chilling carcasses so that factors such as shelf life, meat quality and consumer acceptability are enhanced.

Consumer demand has led to several Institute projects. Among them was a new study investigating the use of canola oil in preparing snack foods. The intent was to compare the performance of canola oil against that of other common vegetable oils, such as soybean or cottonseed oil. The ultimate objective is to substitute a locally produced commodity for an imported product.

A third processing research effort looked at developing processing procedures for producing fibers, by-products and other value-added products from the vegetable rhubarb. The ultimate goal is to find out if there are enough alternative uses for rhubarb in order to encourage full-scale rhubarb production in Alberta.

In 1989-90, the Institute supported five projects in the area of diversification. The goal of these projects is to find or develop alternate means of utilizing or producing a commodity. For instance, one project investigated substituting cull or off-grade field peas and canola meal for soybean meal in the rations of market weight pigs. Other diversification topics included allergy-free infant formulae and metabolic engineering of canola.

Marketing research can be of critical importance to Alberta's agri-food sector. Without it, Alberta farmers and processors may miss the signs which will allow them to recognize new markets and new production opportunities before the competition.

In its research portfolio, the Institute had four marketing projects. Of these, two studies were especially concerned with getting supplies to consumers. Another project examined 12 variables for each of 15 oats varieties which were planted in six different locations in Alberta. The intent of the study was to determine how the location of the crop affects its quality and uniformity. These two factors have become essential to good sales in the modern oats market.

The fourth marketing project was aimed at developing a new method for handling compressed alfalfa which would require less handling and be better suited to export requirements.

The most encompassing of the Institute's five research priorities is production efficiency. The category pertains to all primary agricultural commodities and includes all research which could assist farmers to reduce costs and to increase returns in both crop and livestock production. Among the projects funded by the Institute in 1989-90 was one which evaluated preimmunizing calves against bovine respiratory disease.

This project tested a specific commercial product and found its benefits to be neutral or negative. However, the same research also confirmed that calves which moved directly from ranch to feedlot were considerably healthier as a group than calves which moved from ranch to auction mart to feedlot.

Other production efficiency projects covered a great many topics and subjects. Some involved techniques which fall under the broad term of biotechnology. One project, for example, studied how cattle could better digest low quality feed by using genetically altered microorganisms that are part of the digestion process. Another looked at using tissue culture to eliminate potato diseases. This could reduce the possibility of importing disease from the United States in potato lines being studied for their adaptability to Alberta growing conditions.

The Institute's fifth research category – resource conservation – supports research which could help farmers to sustain their productivity while maintaining or even improving soil and water quality. One 1989-90 project concerned developing an innoculant which would allow nitrogen fixation to occur at lower temperatures. Even reducing the threshold just 1°C would provide farmers extra time, an important consideration in northern Alberta. One extra degree, for instance, would allow alfalfa to reach its maximum nitrogen fixing ability about one week earlier each spring.

MATCHING GRANTS PROJECTS

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
AGRICULTURAL PROCESSING				
Technological Investigations for Development of Whey-Based Beverages to study the problem of sediment formation in whey-fruit juice products; and to verify the effectiveness of proposed treatments under conditions of UHT processing.	P. Jelen University of Alberta *Edmonton*	Palm Dairies Limited Wisconsin Milk Marketing Board, Inc.	22,138	26,550
Development of Vegetable Fibres as a Food Ingredient to develop technologies for the production of food fibres from rhubarb (or similar vegetables); and to investigate their use as an ingredient in food products, especially fabricated foods requiring a fibrous texture.	B. Ooraikul University of Alberta *Edmonton*	UFL Foods Inc. H.P.S. Investments Ltd.	37,500	33,500
Crystallization Control of Honey Products to study the effect of temperature at the time of packing, and dextrose/water ratios of the honey on product crystallization.	P. Sporns University of Alberta *Edmonton*	Alberta Honey Producers Co-operative Limited	14,700	15,700
Optimization of Modified Atmosphere Packaging to Extend the Market Life of Meat and Meat Products to determine the optimum modified atmosphere for market life extension of a range of meats and meat products prepared as sandwiches; and to determine the microbiological safety of products that have been seeded with pathogenic bacteria and stored under conditions simulating good and abusive storage.	M. Stiles University of Alberta *Edmonton*	Gainers Inc.	15,000	32,100
Research and Development of UHT Whipping Cream with an Extended Shelf Life to study the effect of milk quality and selected variables on the physical and chemical characteristics of fresh cream and storage stability of UHT whipping cream.	L. Ozimek University of Alberta *Edmonton*	Palm Dairies Limited	13,500	13,200
Improving Meat Quality through Pre-Slaughter Electrolyte Control in Pigs to examine the efficiency of a new slow release magnesium supplement in reducing pale-soft-exudative (PSE) pork in halothane-positive pigs.	A. Schaefer Agriculture Canada *Lacombe*	Verla Pharm Company	2,000	in progress
Optimization of Chilling Systems for Red Meat Carcasses to complete the construction of a research blast-chill unit for chilling red meat carcasses at temperatures between 0° and -40° C; and to determine the effects of very low chilling temperatures on product yields, quality, sensory value and processing attributes in beef and pork.	S. Morgan-Jones Agriculture Canada *Lacombe*	Energy, Mines, Resources Canada Alberta Cattle Commission	75,000	completed
Quality and Stability of Snack Foods Fried in Canola Oil Products to evaluate and compare the odor/flavour, appearance, texture, and storage stability of snack foods deep fried in canola oil, canola liquid shortening and commonly used vegetable (soybean, cottonseed) oils.	Z. Hawrysh University of Alberta *Edmonton*	Canola Council of Canada		16,180

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
Optimization of Post-Mortem Technology for Quality Assurance in the Processing of Beef to develop a quality assurance program for the post-mortem treatment of beef by investigating several factors which affect its palatability.	S. Morgan-Jones Agriculture Canada *Lacombe*	Alberta Cattle Commission		18,000
The Enhancement of Marbling Fat to Meet Japanese Specifications for High Quality Beef to develop a strategy that will help Alberta farmers to produce the highly marbled beef needed to meet Japanese import specifications.	S. Morgan-Jones Agriculture Canada *Lacombe*	Canada Packers Inc.		32,800
The Effect of Porcine Somatotropin on Processing Technology and Animal Welfare to examine the effect of recombinant DNA-produced somatotropin (rPST) on processing yield and quality in bacon and ham products; and to examine whether rPST-treated pigs display any aberrant or sterectype behaviors.	S. Morgan-Jones Agriculture Canada *Lacombe*	Monsanto Canada Inc.		40,368
DIVERSIFICATION				
Ensiling of Rumen Contents and Whole Blood Using Cereal Straw, Cereal Grain and Bacterial Inoculant to compare the ensiling quality of mixtures of paunch residue and whole blood mixed with ground cereal straw or cracked barley grain; and to evaluate the efficacy of a lactobacillus inoculant in improving fermentation quality of the waste mixtures.	R. Grimson Lakeside Farm Industries *Brooks*	Lakeside Farm Industries	8,000	in progress
Technological, Biochemical and Nutritional Aspects of Production of Allergy-Free Infant Formulae Based on Cow's Milk to apply recent technological processes to produce allergy-free infant formulae based on cow's milk.	L. Ozimek University of Alberta *Edmonton*	Alberta Dairymen's Association	19,760	21,840
Combination of Canola Meal and Field Peas for Use in Rations for Market Pigs to explore the complementarity of cull or off-grade field peas and canola meal when used as protein supplements in pig rations; and to compare their efficacies with both low and high protein barley.	J. Bell University of Saskatchewan *Saskatoon*	Canola Council of Canada	18,910	final report pending
High Quality Semidwarf Winter Wheats for Southwest Alberta to identify hard red winter wheats that are high yielding, hardy, stiff-strawed and high quality.	J. Thomas Agriculture Canada *Lethbridge*	Alberta Winter Wheat Association Beswick Farms	3,250	3,500
Oilseed Diversification by Metabolic Engineering of Canola to isolate genes and regulatory elements which cause lipid body proteins to be produced in canola seed, and to use the knowledge gained in the development of new industrial products from currently grown oilseeds.	M. Moloney University of Calgary *Calgary*	Sanofi Elf Bio Recherches/King Agro		30,000

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
MARKETING				
Delivery of Extension Services to Alberta Hog Producers to assess the informational needs of Alberta hog producers; and to examine the delivery of extension services to hog producers by the Alberta Pork Producers Development Corporation, private industry, the University of Alberta and government.	M. Hawkins University of Alberta *Edmonton*	Alberta Pork Producers Development Corporation	11,000	final report pending
Monitoring of On-Farm Voltage Disturbances to define the nature and extent of on-farm power supply disturbances in Alberta.	J. Leonard University of Alberta *Edmonton*	Canadian Electrical Association	18,110	completed
Effects of Variety, Location and Season on Quality, Uniformity and Marketability of Oats Grown in Alberta to study the effects of location, season and variety on quality, uniformity and marketability of oats grown in six diverse agro-climatic regions of Alberta; and to propose new breeding and selection methods for oat quality improvement.	S. Kibite Agriculture Canada *Lacombe*	The Quaker Oats Company of Canada Limited	9,400	9,400
Development of a Modular Hay Handling System for Double Compressed Forage for Export to design, build and test a system for double compressing alfalfa bales to allow high density storage and fast economic handling.	K. Ward Olds Forage Centre *Olds*	Olds Ag-Tech Industries Ltd.		28,300
PRODUCTION EFFICIENCY				
Spread and Survival of Toadflax Growing on Cropped or Fallow Land to determine seed production per shoot of toadflax; and to study seed dormancy and viability of toadflax plants.	J. King University of Alberta *Edmonton*	Western Grains Research Foundation	24,550	24,950
Understanding and Alleviating Green Seeds in Spring Canola to assess the impact of frost and freezing tolerance on the degreening process during seed maturation in *Brassica napus* and *B. campestris*.	A. Johnson-Flanagan University of Alberta *Edmonton*	Western Grains Research Foundation	15,000	15,000
Evaluation of the Safety and Efficacy of an Experimental *Mycoplasma Bovis* Vaccine to conduct a trial to determine the efficacy of an experimental *Mycoplasma bovis* vaccine; and, upon collection of epidemiologic information regarding *M. bovis* infection, to identify the factors which may predispose animals to the disease or are associated with the disease.	G. Jim Feedlot Health Management Services *Okotoks*	Langford Inc. Thiessen Farms Ltd.	15,850	final report pending
Evaluating Air Exchange Rate, Misting and Litter Condition on Heavy Turkey Performance to measure the change in particle concentration and mean particle size for misted and non-misted environments; and to assess turkey health relative to two levels of dust concentration.	J. Feddes University of Alberta *Edmonton*	Alberta Turkey Growers Marketing Board	5,870	final report pending

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
Epidemiological Investigation of the Pattern of Shipping Fever within Sale, Transport and Feedlot Groups to describe how the pattern of shipping fever is influenced by auction market, transportation and feedlot pen conditions; to determine if shipping fever is communicable from calf to calf within transport trucks, or within large pens at the feedlot; and to develop clinical trial designs which will help to improve future commercial efficacy tests of shipping fever vaccines and other preventive measures.	C. Ribble Western College of Veterinary Medicine *Saskatoon*	Agriculture Canada Ontario Cattlemen's Association	6,515	5,500
Decreasing Embryo Mortality by Dietary Supplementation of an Essential Fatty Acid in Early Gestation to determine the influence of graded levels of linoleic acid in gestation and lactation diets on: embryonic mortality, immunoglobulin levels in the sow and piglet blood and in the sow's colostrum and milk, litter size at farrowing and the development of the immune function in the young pig.	F. Aherne University of Alberta *Edmonton*	Alberta Pork Producers Marketing Board	11,000	completed
Influence of Bovine Somatotropin Injection on Nutritional Requirements, Metabolic Responses, Milk Quality and Reproduction in Dairy Cows to determine the influence of long-term bovine somatotropin (BST) injection on nutritional requirements of dairy cattle, milk yield and composition, biological efficiency of milk production, reproductive performance and the productive life of dairy cows.	J. Kennelly University of Alberta *Edmonton*	Cyanamid Canada Inc.	71,000	71,000
Development, Enhancement and Evaluation of Alberta Protein Sources for Cattle to develop and enhance various protein sources; and to evaluate the resulting protein sources and other protein sources which are currently underused.	J. Kennelly University of Alberta *Edmonton*	American Cyanamid Company Canola Council of Canada The Flax Council of Canada Imperial Oil Limited	80,000	80,000
Effect of Ammoniation on Barley Preservation and Feeding Value to determine if damp (20% moisture) barley can be successfully preserved with ammonia; and to determine if ammoniated barley (20% and 30% moisture) is superior to dry grain in diets for feedlot cattle.	G. Mathison University of Alberta *Edmonton*	Sherritt Gordon Limited	23,400	completed
Dietary Protein and Reproductive Fitness in Male Broiler Breeders to demonstrate the effect of reduced dietary intake of protein on male broiler breeders; and to determine a physiological explanation for the relationship between dietary intake of protein and energy and fertility.	F. Robinson University of Alberta *Edmonton*	Indian River International	3,918	final report pending
Research and Development of Specific Tests to Detect Leptospiral Infection in Livestock to assess possible improvements to the enzyme-linked immunosorbent assay (ELISA) in the detection of leptospirosis by testing antigens from different serovars.	C. Darcel University of Lethbridge *Lethbridge*	Palliser Animal Health Laboratories Ltd.	17,750	in progress

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
Clinical Field Trial to Evaluate the Efficiency of Preimmunizing Calves with a Commercial *Pasteurella* Vaccine to determine the efficacy of the *Pasteurella haemolytica* vaccine Presponse in reducing disease and death due to bovine respiratory disease (BRD) in ranch and auction market cattle.	B. Thorlakson Animal Research International *Airdrie*	Langford Inc. Animal Research International	26,928	completed
Nutritional, Physiological and Microbial Factors that Contribute to Productive Efficiency in Dairy Cows to determine the microbial and physiological basis for individual differences in feed utilization between high- and low-producing dairy cows; and to determine the feeding value of various alternative feedstuffs that have potential to enhance milk production level and efficiency, milk composition and rumen characteristics in high-producing dairy cows.	L. Rode Agriculture Canada *Lethbridge*	Alberta Milk Producers' Association Ltd. Alberta Cattle Commission	30,000	30,000
New Tools to Reduce the Risk of Shipping Fever to develop improved methods of predicting which cows are susceptible to bovine respiratory disease (BRD) so that preventive measures can be targeted to high risk groups; to detect clinically ill calves so treatment can be started; and to predict the outcome of disease so managers can decide whether treatment is worthwhile.	M. Campos Veterinary Infectious Disease Organization *Saskatoon*	Alberta Cattle Commission	33,361	33,361
Development of a Vaccine for Colisepticemia in Turkeys to identify the strain of *Escherichia coli* causing the respiratory disease colisepticemia and to genetically alter these bacteria to produce a vaccine which can be delivered to turkeys in their drinking water.	A. Potter Veterinary Infectious Disease Organization *Saskatoon*	Saskatchewan Turkey Producers Marketing Board Veterinary Infectious Disease Organization	36,200	36,200
Genetic Improvement of Canola through Biotechnology: A Somaclonal Variation Approach to develop an efficient protoplast system for producing somaclonal variants; and to produce, via somaclonal variation, new canola varieties with desirable traits including altered seed fatty acid composition, low glucosinolate content, early maturity, blackleg resistance and shattering tolerance.	W. Scowcroft Biotechnica Canada Inc. *Calgary*	Biotechnica Canada Inc.	75,000	36,700
Evaluation of a New Electrolyte Solution for Use in Milk-Fed Diarrheic Calves to develop a new oral electrolyte solution to be used in the treatment of calf scours.	J. Naylor Western College of Veterinary Medicine *Saskatoon*	Langford Inc. Biostar Inc.	6,000	final report pending
New Concepts in Feeding Growing-Finishing Pigs to test if pigs will voluntarily vary protein intake independently of energy intake, and to test the new Feed Intake Recording Equipment (FIRE) which allows recording the feed intake of each pig in a group of 10 to 15 pigs.	F. Aherne University of Alberta *Edmonton*	Pig Improvement Canada Ltd. Heartland Lysine Inc. Alberta Pork Producers Development Corporation		48,155

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
Biological Evaluation of Full-Fat Oilseeds (Canola, Flax) as High Energy, Protein and Omega-3 Fatty Acid Ingredients in Poultry Feeds to screen and assess the nutritional values of dietary Omega-3 fatty acid rich feed ingredients including full-fat canola, flax and soybean seeds; to study eggs and egg products thus enriched with Omega-3 fatty acids for their potential to reduce cholesterol in humans; and to develop practical least-cost feed formulae for poultry with full-fat oilseeds.	J. Sim University of Alberta *Edmonton*	The Ontario Egg Producers' Marketing Board The Flax Council of Canada		16,500
Effect of a Spray and Burn System on Aspen Forest in West Central Alberta to evaluate a spray, burn and graze system for the development of pastureland from aspen forest in the luvisolic soil area of West Central Alberta; and to compare the productivity of forages in four treatments over two years.	A. Bailey University of Alberta *Edmonton*	P & E Ranch Ltd.		10,000
Improving Reproductive Efficiency in Broiler Breeder Hens to gain knowledge of how the normal reproductive system of the broiler breeder hen is disrupted by obesity, aging, and environmental factors such as water quality; and to determine the effects of feed restriction during various growth stages.	F. Robinson University of Alberta *Edmonton*	Indian River International new-life feeds Lilydale Co-operative Limited		21,000
Control of *Listeria monocytogenes* in Raw Milk to determine the origin of the potential disease causing organism *Listeria monocytogenes* in raw milk; and to determine which sources act as the reservoir for contamination of the bulk tank milk.	H. Jackson University of Alberta *Edmonton*	Alberta Milk Producers' Society Palm Dairies Limited		7,000
Heat Resistance of *Listeria monocytogenes* to determine the factors related to increased heat resistance of *L. monocytogenes* which in turn allows some of these bacteria to survive normal pasteurization procedures.	H. Jackson University of Alberta *Edmonton*	Palm Dairies Limited		7,000
Intake of Lasalocid-Containing Mineral Supplements by Grazing Cattle to determine the inter-animal and intra-animal variability in the consumption of salt-mineral mixtures and forage by grazing cattle in order to provide better formulations to improve performance and reduce cost.	L. Rode Agriculture Canada *Lethbridge*	Hoffman-La Roche Limited		15,000
A Comparison of High-Energy and High-Protein Creep Feeds for Nursing Beef Calves to determine the potential benefits of feeding calves high-energy or high-protein supplements that vary in protein degradability.	D. Bailey Agriculture Canada *Lethbridge*	Canola Crushers of Western Canada Canadian Feed Industry Association, Alberta Division		7,500
Disease Elimination by Tissue Culture and Testing of Potato Breeding Clones to ensure that clones received from breeding programs in the United States are disease free; and to develop a source of disease tested seed tubers of these clones for evaluation in the prairie regional trial system of adaptation trials and eventually by the industry.	D. Lynch Agriculture Canada *Lethbridge*	Alberta Potato Marketing Board Saskatchewan Agricultural Development Fund		12,000

Project Title and Objective	Researcher/ Institution/ *Location*	Other Sponsors	AARI Funding 1988-89	AARI Funding 1989-90
Genetic Manipulation of Cellulolytic Rumen Microorganisms to Improve Low Quality Feed Digestion in Ruminants to identify and enhance species of rumen fungi most active in cellulose digestion in a wide variety of ruminant animals maintained on low quality feeds, and to use the most active ones to feed to newborn ruminants to improve their capacity to utilize low cost and low quality forage.	K. Cheng Agriculture Canada *Lethbridge*	National Biotechnology Strategy Fund		45,000
RESOURCE CONSERVATION				
Metering and Placement of Urea Super Granules to conduct studies on transport, metering and placement of urea super granules; and to compare nitrogen uptake from urea super granules with uptake from granular urea in yield scale trials.	K. Domier University of Alberta *Edmonton*	Norsk Hydro	8,200	completed
Determination of the Optimum Seedbed Conditions for Flax and Canola to study the requirements for producing an optimum seedbed for flax and canola; and to investigate the relationship between the moisture gradient in the soil and seeding depth.	K. Domier University of Alberta *Edmonton*	The Flax Council of Canada Canola Council of Canada Alberta Canola Producers Association	23,700	25,000
Survival of and Contribution to Crop Growth by a Penicillium Species Introduced into the Rhizosphere of Barley under Field and Lab Conditions to refine cultural and microscopic techniques to increase scientific knowledge about plant-microbe interactions in the rhizosphere.	W. McGill University of Alberta *Edmonton*	Elanco Philom Bios	15,226	2,700
Development of an Alfalfa Inoculant for Improved Nodulation and Nitrogen Fixation at Low Soil Temperatures to select strains of *Rhizobium meliloti* and develop *Rhizobium* delivery systems capable of improved nodulation and nitrogen fixation at low soil temperatures.	W. Rice Agriculture Canada *Beaverlodge*	Philom Bios	28,450	62,500
Influence of Climatic Factors on Forage and Crop Production at Sites in East Central Alberta to measure precipitation, evaporation, soil moisture and temperature; and to monitor the influence of these factors on forage and crop production.	D. Westerlund Chinook Applied Research Association *Oyen*	Chinook Applied Research Association Atmospheric Environment Service	5,845	4,832
Evaluation of Coated Urea and Development of New Efficient Time-Released N Materials to investigate if crop nitrogen (N) uptake efficiency can be improved by coating conventional N fertilizer granules with new time-released materials; and to study if the amount of crop-available N derived from soil for spring-sown crops is greater if the release of available N from the soil is suppressed during the previous fall and winter.	M. Nyborg University of Alberta *Edmonton*	Esso Chemicals		7,700

National Agricultural Biotechnology Initiative

The National Agricultural Biotechnology Initiative, announced in 1987, is intended to assist the private sector in agricultural research, and especially to help it commercialize new biotechnology products. This federal government program is scheduled to last three years. The total cost to the federal government is estimated at $25 million. All four western provinces are eligible to participate, but they are required to match federal funds for projects approved in their respective regions. The Institute Board directs Alberta's participation in the program and decides on joint funding of projects approved under the Initiative.

Research Professorship Funding Program

During its reviews of agricultural research, the Institute Board found several areas of importance to Alberta's agricultural sector which required additional professional expertise to develop benefits for the industry. The mechanism selected by the Board to provide this expertise was research professorships located at universities.

In 1989-90, the Institute approved $80,000 for each of four research professorships. Institutions receiving awards must provide any additional funds needed for equipment, technical manpower, supplies and other costs.

The subjects approved for professorships include animal welfare and ethology, food packaging and preservation, marketing of value-added agricultural and food products, and soil conservation. Each professorship is for a three-year term, and the person selected is expected to help train other individuals to continue the work in the particular specialty.

FINAL REPORTS RECEIVED

Final reports were received by the Alberta Agricultural Research Institute to March 31, 1990 for the following research projects funded by the Institute.

Researcher	Title
B. Thorlakson	Clinical Field Trial to Evaluate the Efficiency of Preimmunizing Calves with a Commercial PasturellaVaccine
J. Haigh	Deer Farming Management Practices and Effects of Various Production Parameters

To March 31, 1990, reports were received for the following projects originally approved under the authority of the Alberta Agricultural Research Trust. On July 15, 1987, the Alberta Agricultural Research Institute Act came into force and the Alberta Agricultural ResearchTrust Act was repealed. On that date, all assets and liabilities of the Trust, including all research underway, became the responsibility of the Institute.

K.W. Domier	Metering and Placement of Urea Super Granules
H.P. Harrison	Design of a Bentleg Plow
F.X. Aherne	Influence of Feed Level and Body Condition Between Weaning and Mating on Sow Reproductive Performance
B.A. Young	Thermodynamics in Overwintering Bee Colonies
J.P. Tewari	Colonization of Barley in Alberta by the "Biological Fertilizers"
P.D. Walton	New Species of Grasses for Alberta
F.X. Aherne	Improving Conception Rates and Ovulation Rates of Gilts and Sows that Have Lost Weight During Lactation
F.X. Aherne	Improving Litter Size and Baby Pig Survival by Dietary Supplement of an Essential Fatty Acid
R.J. Christopherson	Effect of Tyrosine and Tryptophan Supplements on Growth Hormone Release in Pigs
R.K. Salmon	The Establishment of Casein Production Through Genetic Manipulation of a Bovine Casein Gene
M. Hawkins	Impact of Free Trade with the U.S. on the Alberta Egg Industry
C. Hiruki	Establishment of Virus-Free, High Performance Alfalfa Seed Stocks
E.D. Janzen	Investigation of a Skeletal Deformity Syndrome in the Fetuses of Beef Cows Overwintered on Silage

ALBERTA LEGISLATURE

OFFICE OF THE AUDITOR GENERAL

AUDITOR'S REPORT

To the Members of the Board of the
Alberta Agricultural Research Institute

I have examined the balance sheet of the Alberta Agricultural Research Institute as at March 31, 1990 and the statement of revenue, expenditure and unexpended funds for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, these financial statements present fairly the financial position of the Institute as at March 31, 1990 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Donald D. Salmon

FCA
Auditor General

Edmonton, Alberta
July 13, 1990

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

BALANCE SHEET

AS AT MARCH 31, 1990

	1990	1989
ASSETS		
Cash	$1,504,926	$1,457,361
Due from Government of Canada	717,389	580,000
	$2,222,315	$2,037,361
LIABILITIES AND UNEXPENDED FUNDS		
Accounts payable and unearned revenue (Note 3)	$ 496,852	$ 388,149
Unexpended funds	1,725,463	1,649,212
	$2,222,315	$2,037,361

The accompanying notes are part of these financial statements.

OFFICE OF THE AUDITOR GENERAL

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

STATEMENT OF REVENUE, EXPENDITURE AND UNEXPENDED FUNDS

FOR THE YEAR ENDED MARCH 31, 1990

	1990	1989
REVENUE		
Contributions from the General Revenue Fund (Note 4)	$ -	$1,500,000
Contributions from the Government of Canada (Note 5):		
Western Diversification Program	1,000,000	550,000
Solar Energy Research and Development Program	67,232	67,331
Interest	215,988	27,352
Contributions from industry	47,691	71,276
Grant from the Alberta Heritage Savings Trust Fund	12,833	-
Administration fees on contracted research	4,970	6,410
	1,348,714	2,222,369
EXPENDITURE		
Research grants	991,678	392,898
Administration expenses (Note 6)	121,750	97,469
Government of Canada sponsored research	67,232	67,331
Industry sponsored research	47,691	67,276
Administered awards	31,279	589
Farming for the Future program conference costs	12,833	-
	1,272,463	625,563
Excess of revenue over expenditure	76,251	1,596,806
Unexpended funds at beginning of year	1,649,212	52,406
Unexpended funds at end of year	$1,725,463	$1,649,212

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

NOTES TO THE FINANCIAL STATEMENTS

MARCH 31, 1990

Note 1 Authority

The Alberta Agricultural Research Institute operates as a provincial corporation under the authority of the Alberta Agricultural Research Institute Act, Chapter A-13.7, 1987, as amended.

Note 2 Significant Accounting Policies

Research Grants

Research grants are recorded in these financial statements when approved for payment to researchers' accounts. Unexpended balances of grant funds held in researchers' accounts are not reflected in these financial statements.

Contributions from Industry

Contributions from industry represent only cash donations to the Institute for specific research projects and do not include donations in-kind.

Changes in Financial Position

A statement of changes in financial position is not provided as disclosure in these financial statements is considered to be adequate.

Note 3 Accounts Payable and Unearned Revenue

Accounts payable and unearned revenue consist of the following:

	1990	1989
Research grants	$387,664	$294,657
Government of Canada sponsored research	17,745	31,575
Refunds of grants from the Alberta Heritage Savings Trust Fund	11,484	-
Farming for the Future program conference costs	11,816	-
Administration expenses	9,179	1,417
Administered awards	5,245	589
Industry sponsored research	4,945	5,218
Unearned revenue	48,774	54,693
	$496,852	$388,149

Note 4 Contributions from the General Revenue Fund

The Province of Alberta has agreed to provide contributions to the Institute totalling $2,000,000 over a four year period commencing in 1988-89. $1,500,000 in contributions has been provided as at March 31, 1990.

Contributions from the General Revenue Fund are subject to the approval of annual appropriations. The Institute may be required to refund unexpended portions of contributions held at the end of a fiscal year.

Note 5 Contributions from the Government of Canada

Pursuant to an agreement between the Government of Canada's Department of Western Economic Diversification, the Government of Alberta, and the Alberta Agricultural Research Institute, Canada will make a non-repayable contribution to the Institute for agricultural research activities in the total sum of $4,000,000 as follows:

1988-89	$ 550,000
1989-90	1,000,000
1990-91	1,000,000
1991-92	1,000,000
1992-93	450,000

Note 6 Administration Expenses

Administration expenses consist of the following:

	1990	1989
Board members' remuneration and expenses:		
Chairman	$ 24,015	$26,975
Other Board members	59,601	58,508
	83,616	85,483
Personnel	22,033	-
Supplies and services	10,384	7,899
Printing	5,717	4,087
	$121,750	$97,469

Certain salaries and other overhead costs, as well as accommodation costs incurred in the administration of the Institute, have been borne by the General Revenue Fund and are not reflected in these financial statements.

Note 7 Commitments

As at March 31, 1990, the Institute had commitments of $829,400 (1989 $454,900) with respect to grant applications approved by the Board of Directors, but for which all conditions of payment had not been met.

Note 8 Comparative Figures

The 1989 figures have been reclassified where necessary to conform to 1990 presentation.

Note 9 Approval of Financial Statements

These financial statements were approved by management.

BOARD OF DIRECTORS

Chairman:

Mr. Bob Bogle
MLA
Taber-Warner

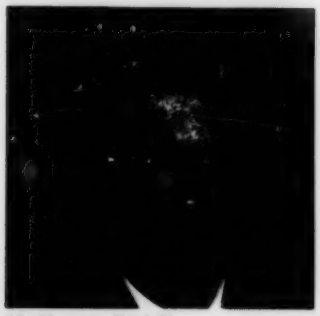
Vice-Chairman:

Mr. Ben McEwen
Deputy Minister
Alberta Agriculture

Members:

Mr. Jack Ady
MLA
Cardston

Mr. Don Althen
Producer
Del Bonita

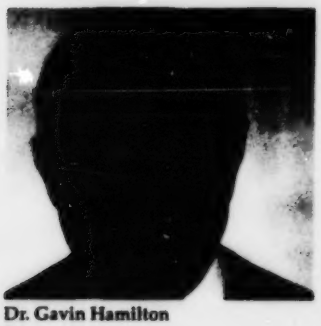


Mr. Norman Caukill
Producer
Caroline

Dr. Dan Cornish*
President
Olds College

Mr. Bill Devereux
Producer
Fort Saskatchewan

Dr. Gordon Dorrell
Agriculture Canada
Research Branch
Ottawa

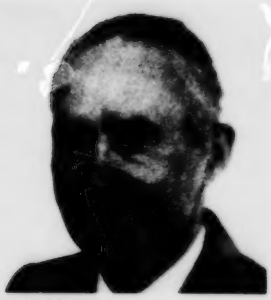


Dr. Gavin Hamilton
Dean
Western College of Veterinary Medicine
Saskatoon

Mr. Peter Hill
Alberta Advanced Education
Edmonton

Mr. Ralph Jesperson
Unifarm
Spruce Grove

Members:



Mr. David Munro
Producer
Innisfail

Mr. Bryan Perkins*
Producer
Wainwright

Dr. David Reid*
University of Calgary
Calgary

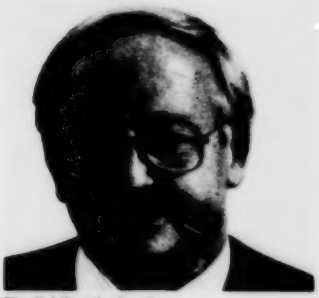
Mr. Gary Severtson
MLA
Innisfail

Mr. Norman Storch
Producer
Hanna

Mrs. Dolores Thornton
Producer
Calgary

Mr. Trevor Thorpe
University of Calgary
Calgary

Mr. Tom Towers
Producer
Red Deer



Dr. Ed Tyrchniewicz
Dean
Faculty of Agriculture and Forestry
University of Alberta

Dr. Alan Vanterpool
Assistant Deputy Minister
Alberta Technology, Research and
Telecommunications

Mr. Gordon Wells
Tradex International
Calgary

*resigned prior to March 31, 1990

RESEARCH COMMITTEE MEMBERS

Agricultural Processing

Chairman:

Mr. Tom Towers
Producer
Red Deer

Members:

Dr. Bill Ballantyne
Gainers Inc.
Edmonton

Dr. Buncha Ooraikul
Department of Food Science
University of Alberta
Edmonton

Mrs. Dolores Thornton
Producer
Calgary

Mr. Sandy Bibby
UFL Foods Inc.
Edmonton

Mr. Bryan Perkins
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Wainwright

Dr. Stephen Morgan-Jones
Agriculture Canada
Lacombe

Dr. Dave Schroder
Food Processing Development Centre
Alberta Agriculture
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Caroline

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Norac Technologies
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Alta Genetics Inc.
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Tradex International
Calgary

Mr. Gary Haley
Palliser Grain
Calgary

Dr. Lu Piening
Agriculture Canada
Lacombe

Dr. Fred Wolfe
Department of Food Science
University of Alberta
Edmonton

Mr. Tom Krahn
Alberta Special Crops & Horticultural Research Centre
Alberta Agriculture
Brooks

Mr. Lud Prudek
Producer
Bow Island

Marketing

Chairman:

Mr. Don Althen
Producer
Del Bonita

Members:

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Producer
Debolt

Dr. Gordon Dorrell
Agriculture Canada
Ottawa

Mr. Jim Graham
Producer
Rainier

Mr. Elden Kaun
Producer
Penhold

Mr. David Keeler
Producer
Raymond

Dr. Bill Phillips
Department of Rural Economy
University of Alberta
Edmonton

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Agriculture Canada
Lethbridge

Mr. Ken Stickland
KenAgra Management Services Ltd.
Edmonton

Mr. Wayne Wilderman
Producer
Blackie

Mr. Cliff Wulff
Market Development
Alberta Agriculture
Edmonton

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MLA
Innisfail

Members:

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Norwest Soil Research Ltd.
Edmonton

Dr. Glen Coulter
Agriculture Canada
Lethbridge

Mr. Bill Devereux
Producer
Fort Saskatchewan

Mr. Gary Gill
Producer
Legal

Mr. Ray Grimson
Lakeside Research Ltd.
Brooks

Dr. Jim Helm
Plant Industry Division
Alberta Agriculture
Lacombe

Dr. Maurice Moloney
Producer
Department of Biological Sciences
University of Calgary

Mr. Albert Pimm
Producer
Grimshaw

Dr. Mick Price
Department of Animal Sciences
University of Alberta
Edmonton

Dr. Otto Radostits
Western College of Veterinary Medicine
Saskatoon

Dr. David Reid
Department of Biological Sciences
University of Calgary

Resource Conservation

Chairman:

Mr. Norman Storch
Producer
Hanna

Dr. Dan Cornish
President
Olds College
(resigned July 1989)

Members:

Mr. Brian Colgan
Irrigation and Resource Management Division
Alberta Agriculture
Edmonton

Dr. Bob Fessenden
Alberta Research Council
Edmonton

Mr. Spencer Hilton
Alberta Conservation Tillage Society
Strathmore

Dr. Wayne Lindwall
Agriculture Canada
Lethbridge

Dr. James Robertson
Department of Soil Science
University of Alberta
Edmonton

Mr. Robert Snider
Producer
New Norway

Dr. Ed Tyrchniewicz
Dean
Faculty of Agriculture and Forestry
University of Alberta

Mr. C.S. (Johnny) Vos
Producer
Keg River